

FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
DEPARTMENT OF ANIMAL SCIENCE AND TECHNOLOGY
2008/2009 HARMATTAN SEMESTER EXAMINATIONS

AGR 303: AGRICULTURAL GENETICS

INSTRUCTION: ANSWER ANY 5 QUESTIONS AT LEAST ONE FROM EACH SECTION.

TIME ALLOWED: 3HRS.

SECTION A.

1. Differentiate between the following terms with appropriate illustrations.
 - i. Phenotype and Genotype
 - ii. Homozygote and heterozygote
 - iii. Dominant gene effect and Recessive gene effect.
 - iv. Alleles and Chromosomes
- 2a. Describe the role of three different areas of genetics.
- b. Give a brief account of the various theories of inheritance put forward before 1900?
3. Using illustrative examples write short notes on five of the following;
 - i. Linkage and Crossover
 - ii. Sex linkage
 - iii. Epistasis
 - iv. Incomplete dominance.
 - v. Law of segregation and independent assortment.

SECTION B.

1a. Given the following base sequence in the DNA template below, identify the mRNA and tRNA codons and anticodons respectively.

DNA: TCG AAG TAC AGA CTT GCC TCC CTG

- b. Why do individuals have considerable phenotypic variation among themselves?
- 2a. Define the term Population in the 'genetic sense'.
- b. Given the MN blood group frequencies in some Nigerian population below.

	Blood Group		
	MM	MN	NN
Yoruba (%)	25.64	43.59	30.77
Number of individuals	20	34	24
Fulani (%)	25.84	49.44	24.72
Number of individuals	23	44	22

Estimate the gene frequency of the M and N blood groups respectively.

c. Assuming that in a herd of 100 short horned cattle, 50 are red, 40 are roan and 10 are white. What are the frequencies of the red and white gene?

SECTION C

- 1a. What are the basic concept of quantitative genetics.
 - b. Outline five statistical tools used in quantitative genetics
 - c. Distinguish the various methods of selection
 - d. List three objectives of selection.
- 2a. Distinguish between the various methods of selection
 - b. List three objective of selection
 - c. Mention two genetic consequences of selection.

SECTION D

- 1a. What is Transgenic Crops/Genetically Modified Organisms (GMOs)
- b. State two reasons for making Transgenic Crops.
- c. Define the following:
 - Somaclonal variation
 - Genetic Map
 - DNA – Library
 - Recombination
 - Ligation
 - Sequencing
2. Explain the following terms:
 - a. Tissue culture,
 - b. Embryo Culture, &
 - c. Biotechnology as a tool in crop improvement.
 - d. Gene, Genome, RNA and Synthetic DNA.